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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/601,596

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Kaicheng Chang

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09/11/2006

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EXAMINER

CHIN, PAUL T

ART UNIT

PAPER NUMBER

3652

DATE MAILED: 09/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/601,596

Applicant(s)

CHANG ET AL.

Examiner

PAUL T. CHIN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3,5,6 and 14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,6 and 14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Applicant's arguments filed June 20, 2006, have been fully considered but they are not persuasive. Due to a new 35 USC § 112 Claim Rejections, a non-final office action follows as below.

#### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-3,5,6, and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicant recites "a micro/nano clutching mechanism" in claim 1, last line. The recited words "micro/nano" are vague and indefinite as to the meaning of micro/nano. It is also unclear as to how the structure is defined. Note that applicant fails to clearly define what a micro/nano clutching mechanism is.

#### **Claim Rejections - 35 USC § 103**

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1,3,5,6, and 14, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Breu et al. (5,263,753) (see PTO-892) in view of Conway et al. (5,538,305) (see PTO-892).

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Breu et al. (5,263,753) discloses a clutching mechanism comprising at least one elastic layer, a flexible membrane (3) (see Figs. 1 and 2), at least two protrusions (8,8) on the lower surface, each having a tip, a supporting mechanism (2) on the upper surface, and a driving mechanism (7), a vacuum pump (lines 61-67 of Col. 1) to deform the layer.

Breu et al. (5,263,753) does not specifically show that the size of the gripper is a micro-gripper. However, Conway et al. (5,538,305) teaches a robotic controlled micro-gripper (1112,1112 of Fig. 11) or other micro-grippers (14-27) powered by a drive mechanism (443-445) for gripping and releasing very small objects. Accordingly, it would have been obvious to those skilled in the art to optimize the Breu et al.'s gripper (5,263,753) to be a micro-gripper as taught by Conway et al. (5,538,305) in order to grip very small objects.

Re claim 5, the shape of the protrusion is a cylinder (Figures 1-4).

Re claim 6, Breu et al. device (5,263,753) shows a vacuum pump (lines 61-67 of Col. 1).

Re claim 14, the middle portion (4) of the supporting mechanism (2) does not obstruct the deformable area even when the deformable area is sunken inwardly

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breu et al. (5,263,753) and Conway et al. (5,538,305), as applied to claim 1, and further in view of Regan et al. (US 2004/0002121) (see PTO-892).

The modified Breu et al. (5,263,753), as presented above, does not specifically show that the material selection for the membrane, or the elastic layer is silica gel. However, Regan et al. teaches that a membrane (110) (Fig. 1C) or a flexible membrane (158), or a micro-platform, having a thickness of at least 1 mm, which can be made of silica (paragraphs 46 and 84), and silica gel for air drying (paragraph 80). Accordingly, it would have been obvious to those skilled in the art to provide a material selection of

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silica or silica gel or Teflon on the membrane or elastic layer (3) of Breu et al.

(5,263,753) as taught by Regan et al. (US 2004/000212121) to provide a smooth and soft layer providing flexibility and deformation.

### ***Response to Arguments***

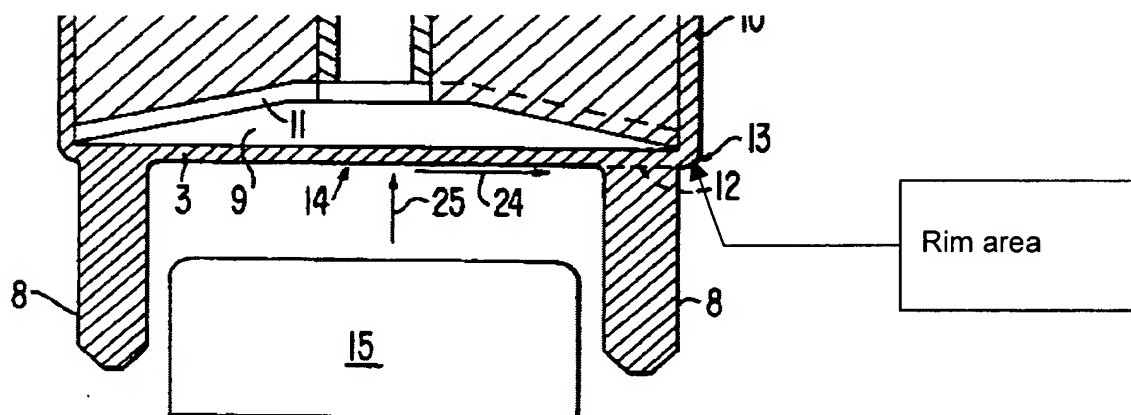
7. Applicant's arguments filed June 20, 2006, have been fully considered but they are not persuasive. Note that applicant incorporate the subject matter recited in claim 13 into claim 1 in the amendment.

#### **Breu et al. (5,263,753)**

#### **Claim 1**

Applicant argues that "Breu clearly fails to disclose an elastic area comprising both a rim area and a deformable area" (last paragraph of page 5). Applicant recites "at least one elastic layer which is a thin layer with a rim area surrounding a deformable area; two sides of said elastic layer defining an upper surface and a lower surface" in claim 1, lines 2-4. Breu et al. (5,263,753) discloses at least one elastic layer, a flexible membrane (3) with a rim area surrounding the deformable area (see Exhibits A and Exhibit B below). Note that applicant does not clearly define "the deformable area".

**Exhibit A**



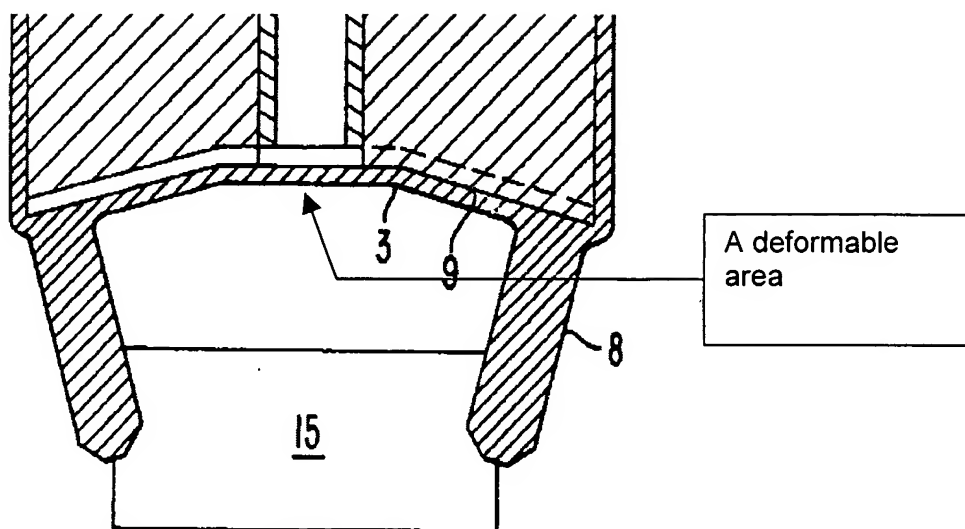
**Exhibit B**

Exhibit B shows a deformable area (in the middle portion) and a rim area substantially surrounding the middle deformable area. Note that the rim area can be defined as an area that surrounds the deformable middle area.

Applicant also argues that "Breu fails to disclose a supporting mechanism anchored to the elastic layer at the rim area" (3<sup>rd</sup> paragraph of page 6). The argument is not persuasive. Exhibit A shows that a supporting mechanism (2) is being substantially anchored to the elastic layer at the rim area. Also note again the applicant fails to clearly define the "boundary of the rim area". Therefore, Breu et al. device (5,263,753) meets the claim.

### **Claim 3**

Applicant further argues that "Breu does not show a rim of a cross section of said hollow tube being fixed to said rim area of said upper surface of said elastic layer" (last paragraph of page 6 and the first paragraph of page 7). Breu et al. device (5,263,753)

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shows a hollow tube (2) having a rim of a cross section of said hollow tube being fixed to said rim area of said upper surface of said elastic layer as shown in Exhibit A.

**Claim 13** (now incorporated into claim 1)

In response to applicant's argument that "it is not obvious to combine Breu and Conway reference (2<sup>nd</sup> paragraph of page 9), the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Breu et al. device discloses that the gripper is simple and "it can be replaced as a result of the very simple construction. It can be fitted to a robot arm in place of a suction gripper because it can operate with the same drive" (Col. 1, lines 26-31). Breu et al. device does not show a micro gripper. The secondary reference, Conway et al. (5,538,305) teaches a micro gripper (170) mounted on a mounting arm (160) of a manipulator (320) and also other micro-grippers (14-27) powered by a drive mechanism (443-445) for gripping and releasing very small objects. Those skilled in the robotic art would optimize the Breu et al. device to modify as smaller device to grip or pickup smaller objects since the Breu device is compatible with other robotic arm as disclosed.

**New Claim 14**

Applicant refers to Figure 3 to support the recited subject matter of claim 14. Note that applicant elected Figs. 4 and 5, with traverse on August 11, 2005. Applicant argues that "Breu fails to disclose the subject matter claimed in new claim 14" (last paragraph of page 9). Claim 14 recites "said supporting means (mechanism) does not obstruct said

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deformable area when said deformable area is sunken inwardly". It is agreed that some of the portion of the supporting mechanism (2) substantially obstruct the deformable area located at the outer portion of area 14. However, some of the supporting mechanism (2), located in the middle portion (4), does not obstruct the deformable area when said deformable area is sunken inwardly. Moreover, figure 1 shows the supporting mechanism (2) further having a plurality of ducts (11,11), which radially extended on the supporting mechanism, to facilitate movement of the fluid (Col. 2, lines 3-14), that do not obstruct the deformable area. Further, figure 1 shows a gap (9) being provided to facilitate to position the gripping arms (8,8) and is also controlled by both the vacuum valve (5) and a vacuum pump (6). Therefore, the middle portion of the supporting mechanism does not obstruct the deformable area even when the deformable area is sunken inwardly.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lastovich et al. (2002/0183688) shows a micro-device having a plurality of grippers, a supporting mechanism, and a vacuum suction.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL T. CHIN whose telephone number is (571) 272-6922. The examiner can normally be reached on MON-THURS (7:30 -6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, EILEEN LILLIS can be reached on (571) 272-6928. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



PAUL T. CHIN  
Examiner  
Art Unit 3652